

***Infection Connection***  
**Front-end Evaluation**

Serrell & Associates

2 April 2002

**Introduction**

A new exhibition at Liberty Science Center called “Infection Connection” will tell how our choices determine the impact that infectious diseases have on people around the world. A front-end evaluation was conducted to assess potential visitors’ familiarity with the topic. This information will give exhibit developers ideas about how to connect with and build on visitors’ interest in, understanding of and feelings about infectious diseases.

This report will summarize the findings, which include the demographics of the 160 respondents; their definitions of “infectious diseases”; which diseases were most familiar; how a disease makes you sick; word associations using a vocabulary pertaining to disease (e.g., bacteria, vaccine, cell); the ways that infectious diseases change a person’s life; and what they think people will find most interesting about the topic. The challenges of the methodology and some implications for the exhibit design are also covered. The Appendices include the original data sheets, transcriptions of the data and rough analysis (sortings and spreadsheets).

**Methods**

One-on-one interviews were conducted by Serrell & Associates data collectors with randomly selected casual family visitors on weekends between the hours of 11:30 AM and 4:00 PM. A total of 160 samples were collected. See Table 1 for the dates, locations and sample sizes.

Table 1. Dates, locations and interview sample size and sheet numbers.

| <u>Date</u>  | <u>Location</u>          | <u>Sample size</u> | <u>Sheet #s</u> |
|--------------|--------------------------|--------------------|-----------------|
| 22-23 Dec 01 | Liberty Science Center   | 39                 | #01-39          |
| 29-30 Dec 01 | New York Hall of Science | 40                 | #40-80          |
| 05-06 Jan 02 | Camden Aquarium          | 40                 | #81-120         |
| 12-13 Jan 02 | Liberty Science Center   | 41                 | #121-161        |

Sample #46 was dropped because it was a duplicate (the same person was interviewed by two data collectors).

Visitors were approached by the data collectors who said, *“Hello—The Liberty Science Center is developing a new exhibit and they’d like to get some opinions and ideas from visitors before they finalize their plans... Would you be willing to spend about six minutes to answer a few questions--We will give you this souvenir for your help--?”* (The recruiting statements were modified slightly for the NYHoS and Camden sites.) If the visitor was in a group, only one adult or child was targeted for the interview, although in some cases adults or children preferred to answer with the help of someone else. If a targeted child deferred to an adult, the data sheet demographics indicated an adult subject rather than a child.

Data collectors wrote down--verbatim in most cases--visitors responses’ to open-ended questions or circled responses on the data sheet for prearranged categories. A sample of a blank data sheet is attached, and all of the original filled-out sheets are in Appendix A. Data were processed by entering all numeric and category responses on a spreadsheet by sample number in Statview and by transcribing open-ended answers by question and sample number in Appleworks word-processing program. Numbers after quotations in this report refer to the number on the data sheet (#1 through #161).

After the interview was completed, each respondent was thanked and given a gift (key chains at Liberty Science Center, astronaut ice cream at NYHoS, and a bubble pen at Camden). Original data sheets were photocopied and originals sent to Serrell & Associates in Chicago.

### **Demographics of the sample**

Data collectors recorded the gender, age and ZIP code for each respondent. Participants were asked if this was their first visit, were they a member of the institution, and did they have any special interests in the topic of life sciences. We found that the majority of the sample was a local audience, making a first visit, were not members, were in their 30s and 40s, and did not have a special interest in life sciences. The ratio of males and females in the total sample was 51% females and 49% males. See Table 2 for the age categories. More discussion about the demographics follows. See Appendix B for a spreadsheet of all the demographic data.

Table 2. Percentage of respondents in different age groups in the total sample.

|                    |     |
|--------------------|-----|
| 10 to 18 years old | 9%  |
| 19 to 29           | 19% |
| 30 to 50           | 57% |
| 50 and up          | 15% |

In answer to the question, “Do you have any special interest or exposure to the life sciences, such as your work, hobbies, leisure activities?” 61 of the 160 (38%) said yes. Examples of special interests included things that related to a job (e.g., teacher, engineer, psychologist), education (e.g., minor in biology, “studied parasites in school”), hobbies (fishing, hiking, “I raise reptiles”) and family connections (e.g., “husband is a doctor”). Ten of the 160 had some medical-related training. They are listed below with the sample number in brackets.

EMT [5, 54]

work in hospital [23]

associate degree in medical lab technology [60]

physician [69]

dentist [73]

nurse [83, 131]

vet student [94]

medical lab tech [101]

See Appendix C for a list of all the responses to ““Do you have any special interest . . . .”

A breakdown of the percentage of respondents with a special interest by institution is shown on Table 3. Compared to LSC, there were differences of 8% and 11%--not great differences given the small sample sizes and variability of visitors' ages, gender and visitation patterns.

Table 3. Breakdown of special-interest visitors by institution.

|                        |     |
|------------------------|-----|
| Liberty Science Center | 34% |
| NYHoS                  | 45% |
| Camden                 | 42% |

Fifty-four percent of the 160 respondents were making their first visit to the museum. Again, there was not much difference between LSC and the other institutions (4% and 10%). See Table 4.

Table 4. Breakdown of percentage of first-time visitors by institution.

|                        |     |
|------------------------|-----|
| Liberty Science Center | 50% |
| NYHoS                  | 60% |
| Camden                 | 54% |

Members made up 13% of the total sample. Members were less likely to be first-time visitors, but they were not more likely to have a special interest. The percentage of members differed between LSC and the other two institutions (by 4% and 18%), but it should be noted that the NYHoS samples were all

collected on one weekend, when there might have been special programming for members those days.

See Table 5.

Table 5. Breakdown of percentage of members by institution.

|                        |     |
|------------------------|-----|
| Liberty Science Center | 10% |
| NYHoS                  | 28% |
| Camden                 | 6%  |

ZIP codes were recorded, and the breakdown, by museum and by state they were from are shown in Table 6. For all three institutions, the majority were from within the state, but there also seemed to be a substantial number of out-of-state visitors.

Table 6. ZIP codes and percentage of visitors from different states by institution.

|                        |             |
|------------------------|-------------|
| Liberty Science Center | 53% from NJ |
|                        | 27% from NY |
|                        | 20% other   |
| NYHoS                  | 75% from NY |
|                        | 15% from NJ |
|                        | 10% other   |
| Camden                 | 53% from NJ |
|                        | 30% from PA |
|                        | 17% other   |

Appendix D lists all ZIP codes by city.

**Had visitors ever heard the term “infectious diseases”; could they define it and give an example?**

The vast majority of interviewees (145 of 160, or 91%) said they had heard the term. Eighty-seven percent gave a definition of the term, and 96% gave an example of an infectious disease. If they had not heard of the term or could not give a definition, they were read this definition before they were asked to give an example: *Infectious diseases are illnesses that are spread or passed from person to person or between animals and people.*

While the vast majority of interviewees gave a correct example of an infectious disease, more than half of the examples were either AIDS, flu, or a cold. Table 7 shows the diseases named and the number of times they were mentioned.

Table 7. Diseases named and the number of times they were mentioned in answer to the open-ended question, "What is an example of an infectious disease?"

|  | number of mentions |
|--|--------------------|
| AIDS/HIV   | 43                 |
| Flu  | 23                 |
| Cold   | 21                 |
| TB   | 11                 |
| Various STDs (other than AIDS/HIV)   | 11                 |
| Chicken pox  | 10                 |
| Anthrax  | 7                  |
| Measles  | 6                  |
| Malaria  | 5                  |
| Hepatitis  | 5                  |
| Strep throat, cholera, ebola, influenza, meningitis, mononucleosis, respiratory problem/infection, viral/virus/bacteria thing, small pox | 2-4 times each     |
| Typhoid, endocarditis, pneumonia, polio, ear infection, rubella, gout, leprosy, Lyme disease, and West Nile virus                        | 1 time each        |
| No answer  | 7                  |

Of the 26 different examples given, only six of them were mentioned by more than 10 people. It is noteworthy that although the popular press devoted considerable attention to anthrax in the three months

before the data were collected, less than 5% of the respondents mentioned it. All diseases mentioned are listed in Appendix E.

In their definitions of infectious diseases, respondents commonly used words and phrases such as: “something,” “some kind of disease that can be passed,” “is contagious,” “it transfers,” “spreads,” or “communicated from person to person by the air.” Although there was a range of detail, none of the answers was incorrect. Examples (quotes in italics, with the sample number of the individual who said it) of definitions include:

*Disease that can be passed from person to person. [87]*

*Something one person has that can be transferred through air, touching and sharing. [24]*

*Disease that by virtue of its existence can contaminate you and compromise your bodily existence. [55]*

*Gets into you from coughing and stuff. [44]*

*They hop from one person to the next. [47]*

“Germs” were mentioned by four people; seven others mentioned “bacteria”; six mentioned “virus” or “viral”; two used the word “microbe”; and three mentioned a combination of the above, while the more vague “something” was mentioned by 27 people. Twenty of the 160 (13%) did not offer a definition. A transcription of all the responses is in Appendix F.

The definition-and-example question (above) was open-ended, that is, no examples were offered. In the next question, interviewees were handed cards with names of “common diseases throughout the world” and asked to sort the cards into two piles, infectious diseases and not infectious. We wanted to see if people knew which ones were which.

In general--for 10 of the 11 examples--they did. The majority knew that AIDS, flu, TB, strep throat, malaria and athlete's foot were infectious diseases and that hay fever, lupus, breast cancer and osteoporosis were not. They were split almost 50-50 over polio. See Table 8.

Table 8. Number of times disease name chosen as infectious

|                |     |
|----------------|-----|
| AIDS           | 147 |
| Flu            | 148 |
| Tuberculosis   | 135 |
| Strep throat   | 134 |
| Malaria        | 117 |
| Athlete's foot | 104 |
| Polio          | 77  |
| Hay fever      | 18  |
| Lupus          | 18  |
| Breast cancer  | 16  |
| Osteoporosis   | 3   |

It might be assumed that people under the age of 50 are less familiar with polio than older people, who lived through an outbreak of the disease. The statistics of this sample show that 13 of the 23 visitors (57%) who are over 50 picked polio and 62 of the 135 people (47%) who are younger picked it as infectious.

### **Responses to "How does it make you sick?"**

Although everyone responded to this question, most were not very articulate about how an infectious disease "makes you sick." In general people are more familiar with the symptoms of infectious diseases (e.g., cough, sneeze, ache) and the specific organ or system attacked (e.g., throat, lungs) than with the mechanisms or vectors. Germs, viruses, and bacteria are mentioned somewhat interchangeably. More people commented about AIDS than other diseases, and person-to-person transfer is the most familiar



means of spreading for all infectious diseases. Many people know that athlete's foot is caused by a fungus. Appendix G lists all the diseases and how respondents answered.

Table 9 shows the percentage of people who picked each of the infectious diseases from the cards listed above (AIDS, flu, TB, strep throat, malaria, athlete's foot, and polio).

Table 9. Disease and percentage of respondents who picked it to discuss.

|                |     |
|----------------|-----|
| AIDS           | 32% |
| Flu            | 21% |
| Strep          | 14% |
| Athlete's foot | 13% |
| TB             | 13% |
| Malaria        | 6%  |
| Polio          | 1%  |

Following is a summary of the most common words used in the descriptions of how a given disease makes you sick (in bold), a brief discussion and examples of their answers (quotes in italics, with the sample number in brackets of the individual who said it).

**AIDS attacks your immune system, and you can't fight off other diseases. Get it from unprotected sex.** AIDS was chosen most often, and three-quarters of those respondents said it had something to do with the immune system. Whether they understand exactly what that means, AIDS education apparently has had some impact. Two people seemed to equate "your immune system" with "autoimmune."

**AIDS affects our immune system. Leaves it susceptible to other diseases--especially pneumonia and brain problems. [23]**

**You don't die from AIDS, you die from something else. It breaks down your immune system. [109]**

**Auto Immune Deficiency Syndrome- IV drug use, sex. It decreases your immune system until you succumb to another disease. [83]**

**Flu gives you a headache, pain, chills. Get it from something in the air, outside in cold damp weather. People are very familiar with symptoms of the flu, but there is little agreement as to the causal agent (a virus, germ, bacteria, air). No one mentioned “influenza.” Four people mentioned that cold or damp weather are to blame.**

**Your body hurts, headache, strong cold, fever. No, don't know how that happens.[128]**

**Flu germs get into the muscles – get aches. Constriction of nasal passages, mucus, chills- spiky fever. Spit can be green, yellow due to boarder bronchitis. [54]**

**You get a fever because the bacteria is at it's peak and your body tries to fight it off so it gets really hot. [9]**

**Flu virus works by replicating their DNA onto the DNA of the hosts cell. That's why you can't get a pill for a virus- much more sophisticated than a bacteria. [60]**

**Strep throat is an infection of the throat. Five of the 23 people who picked strep throat mentioned that it involved bacteria, but no one named Streptococcus. Two people mentioned pustules in the throat.**

**A tremendously sore throat. [108]**

**Strep- bacterial infection that spreads by contact with another's mucus. [106]**

**Athlete's foot is caused by fungus on your skin. Feet get it in the shower. Twelve of the 20 people mentioned “fungus” by name. This was the only disease where the majority of people are familiar with the infectious agent.**

**Take a shower where the fungus is and it enters through the skin. [97]**

**TB affects your lungs. Respondents' familiarity with TB may be disproportionately high, given the demographics (i.e., most live in big cities with large immigrant populations). Fifteen of the 20 people specifically mentioned lungs or respiratory system. Two people named a bacterium.**

**Very contagious- you basically cough yourself to death. [33]**

**The Tuberus bascillus attacks the lining of the respiratory system and lungs. [75]**

**Malaria is spread by mosquitoes. Get a fever. Malaria was familiar to some visitors, almost all of whom associated it with mosquitoes.**

**Four types, transferred by the Anopheles mosquito. It's a parasite that matures inside the mosquito. When they feed on us, they inject us with the parasite, which matures in us. It incubates in the liver, then spreads to the rest of the blood. You get general malaise, high fever, sometimes fever spells. [85]**

**Get it from a mosquito. Army folk get it a lot. You get a high fever and hallucinate. I think you get the fever from your body fighting the bacteria, not sure.[107]**

**Polio was the least familiar disease. Two people talked about it, and neither mentioned a vector or cause.**

**Polio attacks the limbs, via the nervous system. [134]**

**Very serious. It attacks your muscles and bones. Leaves permanent damage to your body. [29]**

**In their descriptions, some people misspoke certain words or concepts, suggesting that they have heard these words used but do not have a clear understanding of what they mean. Here are some examples: "pneumatic fever," "AIDS eats your white blood cells," "germs break down polypcules."**

The general notion that an infectious disease “attacks” something is a broad starting point for discussion in the exhibition of what is attacking, how it attacks and how the resulting familiar symptoms are produced.

#### Word associations

Interviewees were shown cards with nine different words and asked to tell what came to mind, such as a definition or another word associated with it. Below are the given words (underlined> and the words people came up with in response. Numbers in parentheses indicate number of people who mentioned the words. Most people gave a response. Two to four people did not respond to each word, except “parasite,” for which eight people had no response.

#### Allergy

|                                      |      |
|--------------------------------------|------|
| sneeze, sneezing                     | (45) |
| hay fever                            | (23) |
| pollen, flowers, grass, cats         | (20) |
| cough, itchy watery eyes, runny nose | (14) |
| allergic reaction to something       | (12) |
| other: math, wife, my mom            |      |

#### Bacteria

|  |      |
|--|------|
| germs  | (27) |
| infection, disease, sick                                 | (31) |
| dirty (disinfect)  | (17) |
| small, microorganism                                     | (14) |
| named a disease caused by bacteria                       | (13) |
| e.g., strep, cold, flu, meningitis, trichinosis, malaria |      |

#### Cell

|   |      |
|---|------|
| basic part of life, basic part of body              | (49) |
| e.g., “what makes up body” “building block of life” |      |
| named a part of a cell                              | (28) |
| e.g., membrane, nucleus, wall, mitochondria         |      |
| blood, red  | (20) |
| small, single, round                                | (12) |
| amoeba  | (10) |
| other: phone, prison, buy, bin Laden                | (10) |

#### Environment

world, surroundings, everything, habitat,

|   |      |
|---|------|
| nature, ecosystem, outdoors               | (58) |
| air, trees, water, forest, seashore       | (24) |
| clean, healthy, fresh                     | (23) |
| home, community, place                    | (20) |
| pollution, protection, conservation       | (11) |
| <b>Fungus</b>                             |      |
| athlete's foot, feet, toes                | (40) |
| mushroom (35)                             |      |
| grows, growth (green, white, unhealthy),  |      |
| living, alive                             | (16) |
| mold                                      | (11) |
| dirty, ewe, uck, disgusting,              |      |
| crud, smelly, gross                       | (14) |
| among us                                  | (4)  |
| <b>Parasite</b>                           |      |
| bug                                       | (16) |
| worm                                      | (15) |
| examples:                                 | (21) |
| leech, tick, malaria, mosquito            |      |
| feeds on, lives off                       | (14) |
| host                                      | (6)  |
| people: ex-wife, lawyer, bum              |      |
| don't know                                | (8)  |
| <b>Vaccine</b>                            |      |
| polio                                     | (24) |
| cure                                      | (23) |
| prevention, protection                    | (20) |
| shot                                      | (18) |
| immune, inoculation                       | (14) |
| needle, injection, medicine               | (15) |
| (how it works)                            | (6)  |
| <b>Virus</b>                              |      |
| makes you sick--                          |      |
| AIDS/HIV                                  | (25) |
| flu                                       | (22) |
| sick                                      | (15) |
| cold                                      | (11) |
| communicable, spreads                     | (15) |
| no cure, can't medicate, death            | (7)  |
| computer                                  | (3)  |
| <b>Disease</b>                            |      |
| named a specific disease                  | (41) |
| e.g., AIDS, cancer, malaria, flu, TB      |      |
| infection, infectious, contagious, spread | (18) |
| mentioned death, die, or dying            | (15) |
| illness                                   | (13) |

We can see from these word associations that there are lots of familiar words in people's vocabularies about infectious diseases and even some humorous associations. Exhibit

developers can draw from these for ideas about labels and interactives. A list of all the responses for each of the words can be found in Appendix H.

#### **Infectious diseases change people's lives in many ways**

The question about how diseases change your life went through an evolution as we used it in the interviews. During the instrument development/testing stage, the question was, "Have any of these infectious diseases touched your life or the lives of people you know?" Visitors tended to answer this as a yes-or-no question. On the questionnaire (samples #1 to #39) we changed it to, "In what ways has one of these diseases touched your life or the lives of people you know?" This prompted many people to withdraw, become reluctant to answer, and say that it was too personal. If they did answer, they were often brief and mentioned a family member: "Uncle died of TB."

We decided to try another version, and if that didn't work, we would drop the question. We changed it to, "In what ways do you think infectious diseases like these (AIDS, shingles, tuberculosis and hepatitis) change a person's life?" This was less personal and apparently gave visitors the distance they needed to think about an answer. Many of their responses were much longer and detailed than any other answers given to questions in the interview (samples #40 to #161).

Several strong themes emerged regarding the changes infectious disease bring to a person's life, including need for medicine, debilitation, social isolation and early death. Few people had anything positive to say. Trends and examples are given below with the approximate number of people whose comments fit the category (some answers fell into more than one group, making it difficult to calculate meaningful percentages).

Appendix I lists all original responses by theme.

- **Death as a result of these diseases was mentioned in 35 responses.**

**You can die from it. [56]**

**Oh my god, lots of ways! It could kill you- that would be the ultimate. [87]**

**It can be terminal. [83]**

**Most of them are deadly, life-threatening. [136]**

- **Decreased quality of life was mentioned often; in 31 responses it was extreme, and in 16 others the changes were less catastrophic but still very serious.**

**It affects your quality of living- getting around. Living a normal life- it becomes totally abnormal. [66]**

**Lots of people with chronic illnesses have a very hard time adjusting to living with it. [69]**

**They make you unable to carry out the functions of everyday life. [80]**

**They severely impact the quality of life; health, income, and socioeconomic status. [152]**

**Some are chronic, so it's lifelong and can affect a person's entire life. [40]**

- **Social isolation was mentioned by 22 responders.**

**Limited contact with outside world and other people. [57]**

**They are outcasts from society. Looked down upon, people are scared of them. [61]**

**You might lose your friends, job, etc. People with AIDS are really afraid of that. You would change everything you did. [124]**

- **Submitting to a medicinal regimen was a specific change due to disease mentioned by 16 people.**

**They require active and intense treatment which requires medicine for a long time. You need to change your lifestyle to accommodate that regimen of medicine. [55]**

**They would have to get on treatment. [116]**

**You wouldn't be able to do the stuff you normally do. Couldn't see people as much. Take a lot of medicines and have to really keep track of them. It would suck. [107]**

- Nine responders looked beyond the problems of living with disease and thought of ways that disease might make one a better person.**

**They have to start thinking about what's important in their life, since they don't have long to live. [78]**

**It makes you feel the importance of family. [88]**

**Makes you look at life differently. When people are sick they try to help other people more. [142]**

**Other trends included knowing/naming someone who got sick (21 mentions), avoiding the question (5), and no response (10 people). Most of these responses were to the first version of the interview question at LSC , samples [1] to [39].**

**What visitors will find most interesting in the new exhibition**

**The last question of the interview told visitors what the main idea of the new exhibition would be ("It's about how our choices determine the impact that infectious diseases have on people around the world.") and asked them, "What do you think people will find most interesting about that topic?" Responses were often compound ("How they pass from one person to another and**



how to prevent them.”) In Table 10 the major categories are listed with the number of responses that best fit there, and below that, examples are quoted.

All responses are in Appendix J by number and by category.

Transmission, prevention and protection were the largest categories, along with general interest. Global aspects were of interest, as were the mechanisms of how the disease works and personal relevance. Only a few people mentioned cures (probably because, as we saw above, infectious diseases are largely perceived as being terminal) or symptoms (they are already quite familiar with these).

**Table 10. Major categories of interest in infectious diseases and number of responses coded for that category.**

|                                    |             |
|------------------------------------|-------------|
| <b>Transmission</b>                | <b>(35)</b> |
| <b>Prevention, protection</b>      | <b>(30)</b> |
| <b>Mechanisms, details</b>         | <b>(18)</b> |
| <b>Global aspects</b>              | <b>(18)</b> |
| <b>Personal relevance</b>          | <b>(17)</b> |
| <b>Cures</b>                       | <b>(6)</b>  |
| <b>Symptoms</b>                    | <b>(3)</b>  |
| <b>General learning, awareness</b> | <b>(31)</b> |

**Examples of comments about transmission, prevention and mechanisms:**

**A better understanding of what they are and how you can catch them. [62]**

**How vulnerable we are to them. Also- prevention and cure. [59]**

**How you get them and what happens. [89]**

**Being able to have your kids see the connection between how to get the disease and how to avoid it and the ramifications of it. [147]**

**Maybe about the origins, how they start. Also protection, how we can avoid them. [66]**

**How the disease is spread and how people function who already have it. How they live from day to day. [70]**

**It would be important to say which things you can catch and which you can't, especially for kids. Maybe symptoms, too. [138]**

**Examples of comments about personal relevance and feelings:**

**I think they'll be surprised-- how many people have a lot of misconceptions about what keeps you safe from infectious diseases. [60]**

**There are certain things that people think are airborne or via bodily fluids, but are not.**

**And because you have a disease, you're still a human being and you can still be touched, especially AIDS patients. [156]**

**How to deal with people that have diseases. [126]**

**It's a scary topic, if you understand how easily things can be spread. [37]**

**A connection between diet, exercise and health. [77]**

**Tie in with school immunization. That's very important. [87]**

**Anytime people can see what they make a choice on makes a difference, they will be interested. [13]**

**The main ideas of interest were about how diseases spread or how they are transmitted, how to stay healthy and how specifically to avoid catching them. Prevention, protection, vaccines, choices and control are of more concern than cures, although living with disease, how medicines work and a better understanding of how disease affects your organs were also of interest. To tie into the main idea of the exhibition, the global aspects of infectious diseases were of interest to people in these ways:**

**People suffer from the same diseases around the world. [16]**

**There is such a large immigrant population here, it would be a great idea to highlight the differences between infectious diseases globally and in the U.S. A good example is TB. There is a large problem with TB in Queens. [69]**

**How Third World countries are most at risk because of their lack of education and knowledge about them. [20]**

**How AIDS could be eliminated; what's being done to eliminate those diseases around the world, on a practical level. [140]**

**How infections spread culturally, how certain people are more prone. [30]**

**How lucky we are as Americans that we have access to treatment for so many diseases.**

**How diseases such as cholera and diphtheria are still problems in other places. [153]**

**Diseases throughout history- big ones like the Black Death and stuff. [107]**

**It's important to stress the need for a global health organization. [75]**

**Many people's answers to the last question ("What's most interesting?") suggest a strong interest in public health issues, but they were responding specifically to the question's setup, which framed it in the context of the main theme of the exhibition (How our choices determine the impact . . . on people around the world). This does not mean that people are not interested in the basic biology stories of how an infectious agent makes one sick, about which many people lack a clue. Since they are, in fact, very concerned with their own body's ability to avoid or fight disease, there seems to be a good opportunity for the exhibits to make connections between public health, common symptoms and the biology of infectious diseases.**

## **Conclusions**

The people we interviewed were familiar with infectious diseases. They had heard of them, they can define what the term means, and they can give an example of one. The most familiar infectious disease is AIDS, and the majority of people knew that AIDS breaks down the immune system. Colds, strep throat and the flu were also familiar, but people were far more familiar with the symptoms than the causes or mechanisms of these diseases. People are less knowledgeable about malaria and polio. Most people know what causes athlete's foot and recognize that it is contagious. There seem to be misconceptions about what an autoimmune disease is and the role of cold weather in causing the flu. Most people do not have a good understanding of the differences between a virus and a bacterium.

Infectious diseases are seen as serious afflictions, often having no cure and causing death. Before death, there are also serious consequences, including social isolation and submission to difficult medical treatments. For these reasons, many people look to the new Liberty Science Center exhibition as a place to learn about how to protect themselves against these diseases, by understanding how they are transmitted and how to avoid catching them in the first place.

#### **Evaluator's recommendations**

Given the seriousness of the topic, I believe it is important to address people's emotions about infectious diseases and not approach the topic from a strictly academic, informational point of view. The spin for marketing can be the importance of learning how to protect yourself and your family. The exhibition should also be marketed strongly to the health profession and medical training centers and schools. "Infection Connection" seems like an appropriate and suitable title: getting connected to the information.

The exhibition should help people resolve some of their fears and anxieties by having a better understanding of the causes of infectious diseases and how to avoid them. Visitors should leave

with a feeling of more control over their lives in relation to infectious diseases. The exhibit should also nurture feelings of compassion for the sick and dying. Visitors should experience a variety of concrete examples in the exhibition of how our choices determine the impact that infectious diseases have on people around the world. Visitors should leave feeling hopeful about the future of their own family and of other cultures.

Interpretation and interactives should use language and vocabulary familiar to the majority of visitors, which means the concepts should probably not delve below the cellular level in explanations of the mechanisms of infectious diseases. Since visitors will be far more familiar with symptoms, use these as a starting point for discussion. The differences between how viruses and bacteria make you sick and are transmitted should be shown and discussed in multiple points throughout the exhibition. “What floats through the air and what doesn’t” can be compared and contrasted regarding transmission. Athlete’s foot is one disease that offers a reprieve from the specter of death and an opportunity for some humorous discussions.

#### **Issues/problems with the methods**

There were some challenges to doing front-end interviews at multiple sites in a relatively short time frame. The notes below are offered as information for the readers of this report to explain some of the findings and to other evaluators who wish to duplicate the methods used in this study.

#### **Recruitment**

Every effort was made to recruit individuals for interviews, but in some cases people wanted to stay together and answer as a couple. Other times there were few visitors in the gallery to recruit, and couples or families volunteered to split up and be interviewed separately. Given the

opportunistic (rather than strictly rigorous) sampling technique, the demographic data are not statistically reliable and should be looked at more qualitatively. The demographics of the sample were not expected to be an accurate reflection of the audience profiles for the three institutions (which would have required larger samples across more days of the week). Rather, they give some background to an individual's answers. For example, did the person interviewed for sample #60 who mentioned "DNA replication" have some special medical background or training? (Answer: Yes.)

**Why weren't more children interviewed?**

It was decided that adults would be the primary target audience for the front-end evaluation for several reasons. First, a front-end evaluation asks, What do people know about the topic? Given the complex nature of the topic, we did not expect adults or children to have much depth to their understanding of infectious diseases. If we found out what adults knew, we could assume that children knew less. Second, the objective was to find good entry points to people's knowledge (or misunderstandings) of infectious diseases to be able to make an exhibition that would be understandable to adults--including parents and teachers who could then help their children understand it. And third, subjects were recruited randomly and sometimes children deferred to their parents to answer the questions, thereby lowering the proportion of children in the actual sample. The instrument that we used was tailored in adult language. If the target audience had been children, the questions would have been rewritten with different assumptions and vocabulary level. Even the way it was written, some people found it to be more like a test than fishing for opinions and ideas, as the recruiting statement suggested.

**Gifts**

We offer a gift as an incentive to participate in an interview because we want to show that we value people's time and appreciate them taking a moment out of their visit to answer our

questions. The gifts are usually valued at \$2 or \$3 dollars and are immediately useful (as opposed to a free ticket for a return visit). Occasionally a group may find the interviewee's gift so attractive that they all want one. If the group is not too large, i.e., two or three people, we try to be generous. In one case, each member of a family wanted a gift and wanted to be interviewed for it. In another case, a man apparently wanted more than one gift for himself, and managed to get himself interviewed by both data collectors at separate times. Afterwards, due to his highly unusual answers, the evaluators compared notes and realized the scam.

#### **Quotas**

We strove for and met the quotas of 20 interviews per day, 10 per data collector. If interviews had not been done on weekends during a holiday season, the quotas might have been harder to get.

#### **Probing**

The marketing survey lingo for trying to get as much information from interviewees as possible is "probe to exhaustion." Typically, front-end interviews with casual visitors about technical or scientific topics reach exhaustion very quickly. Additional probing can cause people to feel annoyed and reluctant to participate further. Data collectors captured most of the interviewees' words and transcribed them directly to the data sheet.

#### **Missing data**

In general, the data collectors were accurate and complete in filling out the sheets. Among the 160 subjects, only a few pieces of data were lost. Missing demographic data include five ZIP codes, two "special interests", three first visits and four member status. On two sheets, the infectious/noninfectious cards sorted were not circled. The number of "don't know" and "no answer" responses overall is low, an indication that the topic was not unfamiliar or uninteresting to the interviewees.

### **Raw data delivery**

**We asked the data collectors to photocopy the sheets after each weekend's interviews were completed, leave the copies at the institution and ship the originals to Chicago. Most of the time this went smoothly, but weekend access to a functioning copy machine by a nonstaff person can be a problem. Future efforts to work this out need to be done in advance of the weekend, and an alternate plan needs to be arranged. Always make backup copies of the originals, so that if the shipper loses them (even temporarily), you don't have heart failure.**

### **Using other sites**

**For the most part, visitors at NYHoS and Camden Aquarium went along with the idea of being interviewed for an exhibit at a different museum on a topic that, in the case of the Camden Aquarium, was a little weird. Most people, however, probably didn't even realize that the data was for another place. Nevertheless, we felt it was ethically responsible to tell them who we were working for.**

**Thanks to data collectors Lindsay Lifrieri, Trevor Quachri, Marcos Levy and Monica Post.**